Particulate Matter
Longitudinal Panel Studies

Filling the Critical Need for PM Data

Particulate Matter (PM) is a complex mixture of chemically diverse materials and has a little understood, but consistent association with negative health effects. The National Exposure Research Laboratory (NERL) conducts extensive research to aid in the understanding of the health effects of PM exposure.

The Particulate Matter Longitudinal Panel Studies represent a series of human exposure studies implemented by various internal U.S. EPA organizations (the NERL and the National Health and Environmental Effects Research Laboratory) as well as Agency-sponsored external research organizations (Harvard University, New York University, University of Washington, Research Triangle Institute). Beginning in 1997, studies were conducted in eight metropolitan areas. These studies were fundamental in understanding the associations between personal exposure to PM, PM measured at ambient sites, and health effects, especially for susceptible sub-populations. Susceptible sub-populations included chronic obstructive-pulmonary disease (COPD) patients, individuals with cardiovascular disease, the elderly, and asthmatics. Collected data are being used to develop databases representing actual human exposures. These data fill a critical scientific need for the Agency in identifying potentially important exposure variables, as well as providing inputs for modeling and risk assessment.

Several studies showed that, for individuals with little exposure to non-ambient sources, correlations between personal exposure and ambient PM concentration are high. Still, even for these studies, correlations varied by individual depending upon their activities and the microenvironments they occupied. Individual personal PM exposures and the relationship to ambient concentrations may vary by season, residential and geographical setting, and subject groupings. Building type and ventilation characteristics strongly influence both exposure levels and the relationship with ambient concentrations.

What Comes Next

Data from the completed field studies will be validated and databases will be developed to examine the effects of air shed (location/season), population demographics, and residential setting (apartment versus stand-alone homes) on the relationship between personal exposure and indoor, outdoor, and ambient air concentrations for PM/gases. Results will be presented in the peer-reviewed literature. The combined database will be made publically available. Ultimately, these studies will provide accurate exposure data and models that will help provide the sound scientific basis needed for implementing the National Ambient Air Quality Standard for PM.

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Benefits

- Collected data are being used to develop databases representing actual human exposures
- These data fill a critical scientific need for the Agency in identifying potentially important exposure variables, as well as providing inputs for modeling and risk assessment

Purpose

- These studies will provide accurate exposure data and models that will help provide the sound scientific basis needed for implementing the National Ambient Air Quality Standard for PM. This effort supports the EPA's goals of sound science and clean air

Milestones

- Field studies in eight metropolitan areas have been completed
- Numerous peer-reviewed journal articles have been published based on results from the exposure studies

Participants

- U.S. Environmental Protection Agency, Office of Research and Development, National Health and Environmental Effects Research Laboratory and National Exposure Research Laboratory, Human Exposure and Atmospheric Sciences Division
- Harvard University, New York University, University of Washington, and Research Triangle Institute

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For more information on this and other NERL science projects, visit our Website
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